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DRDO at DEFEXPO 2016



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DRDO brings alive Spirit of Make In India at DEFEXPO 2016



डीआरडीओ न्यूज़लैटर

The display of state-of-the-art military systems and technologies by DRDO narrated the saga of selfreliance and national pride with "Make in India" spirit in the 9th edition of the biennial Land, Naval and Internal Homeland Security Systems Exhibition in Defence Expo 2016 during 28-31 March 2016 at Goa. Hon'ble Raksha Mantri Shri Manohar Parrikar inaugurated the exhibition on 28 March 2016 at Naqueri Quitol in South Goa.

The design theme of DRDO Pavilion was "Rise of Futurism", which emphasised its vision to make India prosperous by establishing world-class science and technology base and provide our Defence Services decisive edge by equipping them with internationally competitive systems and solutions.

DRDO's participation in the event marked with the live demo of its star products for the first time at DEFEXPO. The products showcased included: Airborne Early Warning and Control (AEW&C) System; Light Combat Aircraft (LCA) Tejas; Main Battle Tank (MBT) Arjun Mk I and II; Wheeled Armoured Platform (WHAP); Akash Air Defence System; Pinaka Multi Barrel Rocket Launcher System; Radars; BLT T-72; Bridging System Sarvatra; Modular Bridge and Mountain Foot Bridge, etc.

Besides, static display of other attractive outdoor exhibits such as Quick Deployable Mobile

Communication Terminal; Aslesha, Bharani and Coastal Surveillance Radars (CSR); MRSAM and Nirbhay launcher; Pinaka Rocket Launcher Mk I and Mk II; Advanced Torpedo Defence System (ATDS), Remotely Operated Vehicle Daksh; etc.

The indoor models and exhibits covered nearly the entire gamut of defence R&D, viz., aeronautics, armaments and combat engineering, missiles, electronics and communication systems, materials, naval systems, life sciences technologies and products, micro-electronic devices and computational systems. Some indoor

exhibits like model of Akash and BrahMos missiles; weapon locating radars; IR Guided Missile Tester; Laser Guided Bomb Kit Tester; Hand-held Stand-off Explosive Detector; Short Range Laser Dazzler; Advanced Towed Artillery Gun System (ATAGS); Nakshatra the Aerostat System; Combat Free Fall System; Biotoilet model; Computerized Pilot Selection System (CPSS) model; Multimode Hand Grenade; family of small Arms, Sonars and Torpedoes; Night Vision and Microwave Devices; Bulletproof Jackets; Robotics and Unmanned Systems; Telemedicine and Ready-to-Eat food technologies, etc.

Focusing on 'Make in India' and 'Self-Reliance', DRDO provided a platform for collaboration with industry and academia. DRDO amply demonstrated its capability to design, develop and realize highly complex multidisciplinary weapon platforms for Army, Navy and Air force. These systems are among the most extensively evaluated systems in harsh environmental conditions, meeting stringent quality requirements of our services.

Dr S Christopher, Secretary, Department of Defence R&D and DG DRDO in DRDO Press Conference held on 29 March 2016 emphasized DRDO's commitment towards 'Make in India' to provide stateof-the-art technologies and products to the Armed Forces. He interacted with media on various issues



related to AEW&C system, Airborne Warning and Control System (AWACS), LCA Tejas, Arjun Mk II, Rustom II, Astra, Helina, Agni V besides many other DRDO products and technologies and their current status and the export potential of BrahMos, Akash and Pinaka as there is an international demand for these products. Dr Christopher also described the new Defence Procurement Policy (DPP) as a big boost for the indigenous design and development process of defence technology.

Raksha Mantri flags off Indigenous Composite Sonar Dome

Raksha Mantri Shri Manohar Parrikar flagged off first indigenous composite sonar dome on 29 March 2016 during DEFEXPO 2016. Dr S Christopher, Secretary, Department of Defence R&D and DG DRDO; Vice Admiral P Murgesan, Vice Chief of Naval Staff; Dr S Guru Prasad, Chief Controller R&D (PC&SI) and Rear Admiral (Retd) RK Shrawat, CMD, MDL were present on the occasion.

The sonar dome has been designed by Research and Development Establishment (Engrs) [R&DE (E)], a Pune-based DRDO laboratory, and

manufactured by composites manufacturing company M/s Kineco Ltd, Pilerne, Goa. India joins a select group of nations with capability of realizing large composites structure with multi-functional requirements, complex geometry and high structural rigidity with acoustic transparency. The dome was actualized using Vacuum Assisted Resin Transfer Molding (VARTM) Process technology with built-in process monitoring capability,



Raksha Mantri flagging Indigenous Composite Sonar Dome (inset)

developed by R&DE (E), to ensure manufacture of quality product.

M/s Kineco, Goa, used VARTM for manufacturing the dome and has joined a select band of companies worldwide with this capability. The country has now capability for realizing more ambitious naval structures such as entire ship hulls as well as land-based and aerospace applications.

Raksha Mantri releases Brahmand World Defence Update Yearbook

डीआरडीओ न्यूज़लैटर

Hon'ble Raksha Mantri Shri Manohar Parrikar released Brahmand World Defence Update 2016, a publication of BrahMos Aerospace at DEFEXPO India 2016 on 28 March 2016 in Goa.

The yearbook provides a comprehensive assessment of the present day global military order with a focus on each Nation's Military capabilities, new arms acquisitions and defence spending of 113 countries along with detailed strategic information on 33 leading countries.

The book, in its latest issue, has attempted to provide an exclusive overview of such

trends by incorporating special segment on "Land Warfare Systems of Brazil, China, France, India, Russia



and USA; which is set to influence the battlefields of tomorrow in a major way.

BARC submits report on High Strain testing

Gas Turbine Research Establishment (GTRE), Bengaluru, and Bhabha Atomic Research Centre (BARC), entered into a five years Memorandum of Understanding (MoU) for High Strain testing of Gas Turbine Engine materials using the Split Hopkinson Pressure Bar. The MoU envisages establishment of specimen geometry, tolerancing, trial tests and subsequent testing of 6 major materials used for the engine. Analysis of data to generate true stress–strain curves completes the programme.

Shri RJ Patel, DS and Associate Director, RDDG, BARC, accompanied by Shri Vivek Chavan, SO G, presented the first report to Shri MZ Siddique, OS and Director, GTRE, on 18 March 2016 at GTRE, Bengaluru.





DRDO celebrates International Women's Day

Armament Research & Development Establishment

Dr KM Rajan, OS and Director, Armament Research and Development Establishment (ARDE), Pune, started International Women's Day (IWD) celebrations with tree plantation on 8 March 2016.

The celebrations comprised a talk on 'Cyber Security' by Shri Yogesh Thanage, Senior Project Manager, Pune Cyber Lab—a joint initiative of Pune Police and NASSCOM-DSCI. His lecture focused on emerging trends in cyber crime and common attacks in cyber space. He elaborated on cyber security issues related to females and IT Amended Act 2008. He also gave practical tips on Dos and Don'ts of Cyber Security.

ARDE Women's Cell, with help from volunteer women officers, conducted an Adult Literacy Programme for women employees of AMS category from October 2015 to February 2016. Basic language and mathematical skills were imparted to help the participants to perform office duties efficiently and deal with important personal matters. The programme material was customised to help learner understand, speak, read and write basic English, and included worksheets, exercises, and storytelling. Three women employees, who had never been to school, attended the Devnagari learning class. Study material obtained from the State Resource Centre, Pune, was used as a reference and creative methods of teaching were employed to make the programme simple and interesting.

An audio/video of the Adult Literacy Programme was showcased on 9 March 2016. Dr Rajan appreciated the commendable initiative of the ARDE Women's Cell and felicitated the participants and the volunteer teachers. A Newspaper raddi donation campaign was also carried out during 1-4 March 2016. The funds generated by selling the raddi would be used by Maitri, a social organization working for tribals in Melghat and Marathwada regions.

Other IWD activities included a bone densitometry examination camp, various competitions and a cultural programme by women employees of ARDE.

Centre for Artificial Intelligence & Robotics

Centre for Artificial Intelligence and Robotics (CAIR), Bengaluru, celebrated IWD on 8 March 2016. The function started with an invocation song and lighting of lamp followed by welcome address by event chairperson Smt Anshu Bhardwaj, Sc E. Smt Manimozhi Theodore, Additional Director, welcomed the Chief Guest Dr HS Rana, Principal Director, Institute of Public Administration, who delivered a talk on Sexual Harassment of Women at Workplace: Prevention, Prohibition and Redressal. The ceremony concluded with a colourful cultural programme and games.



Naval Physical & Oceanographic Laboratory

Naval Physical and Oceanographic Laboratory (NPOL), Kochi, celebrated IWD on 17 March 2016. Smt K Rameetha, Sc F, Coordinator, NPOL Women's Cell, welcomed the august gathering and highlighted the importance of effective parenting in shaping the minds of the next generation and its significance in context of inclusive development of women.

Shri S Kedarnath Shenoy, OS and Director NPOL, in his address, offered felicitations on the occasion of IWD 2016 and observed that although substantial progress has been made on women empowerment in the country, the dismal statistics emerging out of recent studies suggest that much more concerted efforts are needed in this direction.



Dr Kochurani Joseph, Associate Professor, Bharath Matha College, Kochi, was the Chief Guest on the occasion. She delivered an engaging talk on 'Effective Parenting: Challenges in the new Socio-economic Scenario". Her talk focused on the vital role that the parents can play in shaping the thought process of children for a gender unbiased society and thereby enabling equal opportunities and inclusive development of women across the entire societal cross section.

Smt M Remadevi, Sc F, recipient of Suman Sharma Award of the Institution of Engineers (India) and Smt Shiny Nair, Sc D, recipient of the Best Paper Award in the National Workshop on "Women Innovators for Excellence in Research and Science" were honoured as women achievers of the NPOL. Rendition of popular poem of ONV Kurup, renowned Malayalam poet and Njnanapeedam Awardee, highlighting the virtue of motherhood, by Kum Devu Ramesh was the highlight of the function. The celebration concluded with a light music programme by Smt Sudha B Menon, Sc E.



Dr Kochurani Joseph delivering IWD talk at NPOL

Naval Science & Technological Laboratory

Naval Science and Technological Laboratory (NSTL), Visakhapatnam, hosted DRDO International Women's Day Celebrations during 11-12 March 2016. A large number of delegates from DRDO laboratories/estts across the country took part in the event that facilitated interaction among the DRDO women in the country.

The introductory session featured an invited talk by Ms Bhakti Sharma, the youngest and first Indian woman to swim the five oceans, eight seas and channels. Ms Sharma, winner of Tenzing Norgay National Adventure Award, also chaired a panel discussion on "Women Adventurists' Views: Goals, Responsibilities, Enthusiasm, Adventurism and Team Work."

Women scientists from DRDO labs presented their R&D contributions, which included: 'Comparison of Various Classification Methods for Landslide Detection at Tangni, Uttarakhand' by Ms Shikha Srivastava, Pratik Chaturvedi, Khushboo Kumari of Defence Terrain Research Laboratory, Delhi; 'Design and Development of Antenna Pedestal for Airborne Maritime Surveillance Radars' by Smt Raajita Reddy, Athiya Sulthana Syed, Abid Hussain VA of Electronics and Radar Development Establishment, Bengaluru and 'Development of Algorithm for Video Shot Detection' by Smt T Selvathai, Jayashree Varadhan, Swarna Ramesh of Combat Vehicles Research and Development Establishment, Chennai.

Dr CP Ramnarayanan, DS and CC R&D (HR), inaugurated SWADHARM Exhibition—a collective trade fair of lady entrepreneurs. Lady entrepreneurs and women from Mahila Kalyan Manch, NSTL, showcased their talents in the exhibition.

On 12 March 2016, Dr S Christopher, Secretary, Department of Defence R&D and DG DRDO, inaugurated National Workshop on SWADHARM— Scientific Women and DRDO...Harnessing Research and Management. Dr CP Ramnarayanan, DS and CC R&D (HR); Shri GS Mallik, DS and CC R&D (R&M); Dr SC Sati, OS and DG (NS&M); Smt Nabanitha Radhakrishnan, Director, DP&C; Dr Hina Gokhale, Director, DoP and Shri CD Malleswar, OS and Director NSTL, were present during the function.

Dr Gayatri Sankaran, visually challenged Indian Carnatic musician; Ms Ranjana Kumar, former Chairperson NABARD and Indian Bank; Ms Shiela Sri Prakash, Indian Architect to serve on the World Economic Forum and Ms Bhakti Sharma also graced the occasion.

Shri Malleswar welcomed the august gathering and spoke about the societal work being carried out by NSTL in and around Visakhapatnam. He also conveyed his appreciation for the Dhimsa dance performed by



tribes from Lambasingi and bouquets of artificial flowers made by specially privileged kids of various special schools in Visakhapatnam. Dr SC Sati and Ms Nabanita R Krishnan, also addressed the gathering.

Dr S Christopher, in his address, narrated his personal experiences with his mother, wife and daughter. He also appreciated the contributions of women in private sector and DRDO. A Compendium comprising technical papers submitted on this occasion by women scientists of DRDO, was released by Dr S Christopher and other dignitaries. A tree-plantation programme was also organised to mark the occasion.

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Smt DR Rajeswari Devi, Sc F, Chairperson, IWD Celebrations, proposed the vote of thanks.



Glimpses of DRDO IWD celebrations at NSTL, Visakhapatnam

ISSA demonstrates Land Wargame at Army War College

Institute for Systems Studies and Analyses (ISSA), Delhi, in coordination with WARDEC (Delhi), presented and demonstrated under development wargaming system SAMAR at Higher Command Wing, Army War College, Mhow, on 21 March 2016. The demonstration was attended by Commandant AWC, Mhow; Director ISSA; Commandant WARDEC; DS and Seniors Army Officers of Higher Command Wing. The demonstration focussed on Op Plan, Op Order, GIS and execution of aggregated tactical operations.



Raising Day Celebrations

Combat Vehicles Research & Development Establishment

डीआरडीओ न्यूज़लैटर

Combat Vehicles Research and Development Establishment (CVRDE), Chennai, celebrated its Raising Day on 23 March 2016. Shri V Chandra Mohan, Vice Chairman, Works Committee, welcomed the august gathering. Shri AV Raghupathy, Sc E, Chairman, Celebration Committee, spoke about the history of CVRDE. Raising day wishes were given by representatives from SC/ST Association, INTUC, AIDEF and JCM IV level members. Smt Jayashree Varadhan, OS and Additional Director (Mgt), gave a brief about the activities of Works Committee and achievements of other sub-committees during 2015.

Dr P Sivakumar, DS and Director, CVRDE, delivered the Raising Day message and spelt out the achievements of CVRDE in 2015. He also highlighted the major milestones like development of Arjun MBT Mk-II, Arjun Catapult and Unmanned Tracked Vehicles (MUNTRA) achieved by CVRDE. He exhorted employees to make Prime Minister's 'Make in India' programme a grand success.

Cultural programme was conducted by CVRDE officers and staff. The employees who completed 25 years of outstanding services were felicitated with mementoes. Lab awards were distributed on this

occasion. Prizes were also distributed to the winners in sports and cultural activities. Shri E Manoharan, Secretary, Celebration Committee, proposed the vote of thanks.

High Energy Materials Research Laboratory

High Energy Materials Research Laboratory, (HEMRL), Pune, celebrated its Lab Raising Day on 1 March 2016. Shri KPS Murthy, OS and Director, HEMRL, in his inaugural address, conveyed his good wishes to the employees and their families and briefed about various successfully completed, ongoing and new projects. He expressed satisfaction about the overall progress of the laboratory. Tricoloured balloons were released and tree plantation was carried out to mark the occasion.

Employees who completed 25 years of service were felicitated and DRDO Laboratory-level Awards were presented to meritorious employees. In addition 61 officers/staffs were given Cash Awards for their outstanding performance in their field by Dr Manoj Gupta, OS, HEMRL.

As a part of Annual Day celebrations, games such as tug of war, aiming an object with ring and musical chair, etc., were conducted. Shri DK Kankane, Sc G, gave away prizes to winners and runner-ups of various sports competitions.



Dr Sivakumar with cultural event team during CVRDE Raising Day



Shri KPS Murthy inaugurating the Raising Day Celebrations



Manpower Development Activities

Conferences/Seminars/Symposia/Training Courses/Meetings

Certified Reliability Training Programme

Armament Research and Development Establishment (ARDE), Pune, conducted Certified Reliability Training programmes during 22-26 February 2016 and 14-18 March 2016 to inculcate and practice quality and reliability aspects in DRDO scientists right from the stage of product design and development. The programme leads to certification in Reliability Engineering through American Society of Quality (ASQ).

Twenty-two officers from ARDE, High Energy Materials Research Laboratory (HEMRL), Research and Development Establishment (Engineers) [R&DE (E)], Vehicles Research and Development Establishment (VRDE) and MSC Begdewadi, underwent the training programmes.

The training followed six mock tests of two hours each and one final examination. Based on the performance of these mock tests selected participants will undergo the Certification Exam of ASQ. The ASQ certification for the candidates will be valid for three years.

Rajbhasha Technical Seminar

Regional Centre for Military Airworthiness (RCMA),

Chandigarh, organized one-day Rajbhasha Technical Seminar on Design, Production and Testing of Technical Equipment on 30 March 2016. Sixty participants from various DRDO labs, CSIR labs, IAF and other institutions attended the seminar.

Shri Ashwaghosh Ganju, Director, Snow and Avalanche Study Establishment (SASE), Dr Bhuvnesh Kumar, Director, Defence Institute of High Altitude Research (DIHAR), Dr PS Kohli, Regional Director, RCMA, Chandigarh, Dr Anil Khurana, Estate Manager,



Dr PS Kohli delivering talk in Rajbhasha Technical Seminar



Participants of Certified Reliability Training Programme at ARDE



EMU, Chandigarh, Lt Col Shaliash Bansal, GE (R&D), Shri Saurabh, ACDA, AO (R&D) and Prof. Pratibha Kumari, Department of Hindi, SD College, Chandigarh graced the inaugural session.

Dr PS Kohli delivered talks on 'Implementation of Rajbhasha Hindi in Technical Activities' and on 'Thermal

Imaging System and Night Vision Goggles'. During technical session, one invited talk and 15 lectures were delivered by various speakers covering important aspects of technical equipment. Dr PS Kohli facilitated the speakers with token of memento.

Digital Library at ITR, Chandipur

Dr BK Das, OS and Director, Interim Test Range (ITR), Chandipur inaugurated Digital Library (DL) of ITR on 22 March 2016. Dr Das, in his inaugural speech, explained the importance and need of digitization of library activities.

Shri Santosh Munda, Sc C, issued digital cards and demonstrated the functioning of the DL. The automated 'Check-in' and 'Check-out' facility of library books is one of the main features of DL.



Sports Round-Up

DRDO Cycle Rally



Dr P Sivakumar with participants of DRDO Cycle Rally

The adventure club of Combat Vehicles Research and Development Establishment (CVRDE), Chennai, organised DRDO Cycle Rally to Indira Gandhi Centre for Atomic Research (IGCAR), Kalpakkam (110 km from Avadi) during 7-11 March 2016 to create awareness about the products developed by DRDO for the defence forces to general public and also to visit various educational institutions en route to make the students aware of the research and employment opportunities in DRDO.

Dr P Sivakumar, DS and Director, CVRDE, flagged off the rally. About 20 participants from RCI and DMRL, Hyderabad, CAIR, Bengaluru and CVRDE participated in the rally.



The rally team visited Madha Engg College, Kunrathur, Prince Engg College, Ponmar and SSN Engg College, Thirupporur. The team gave motivational speech and interacted with students of Govt Hr Sec School, Kalpakkam. The team visited IGCAR campus and interacted with the officials. Models of Arjun MBT and Carrier Command Post Tracked (CCPT) Vehicle were demonstrated and a detailed presentation was made on products developed by DRDO.

On return, the rally team visited AVIT Engineering College, Mahabalipuram and St Joseph Engineering College, Sholinganallur. A large number students of participated in the demonstration and presentation of DRDO products. The team explained about DRDO's contribution to "Make in India' programme during the rally. Dr Ρ Sivakumar, issued medals and certificates to the participants.

South Zone Cricket Tournament

Gas Turbine Research Establishment (GTRE), Bengaluru, organized the 9th DRDO South Zone Cricket Tournament during 14-17 March 2016. The four-day tournament was inaugurated by Shri MZ Siddique, OS and Director, GTRE.

Nine teams from South Zone participated in the championship. Shri R Ganesh, Sc G, GTRE, presided over the closing ceremony and distributed prizes to the winners. Team GTRE, Bengaluru, was crowned with the championship while team DARE, Bengaluru, was the runner-up.



Shri MZ Siddique tossing the coin for the inaugural match

Personnel News

Awards

IETE Lal C Verman Award 2015

Shri KVB Vasantha Rayudu, Sc F, Research Centre Imarat (RCI), Hyderabad, received IETE Lal C Verman Award 2015 during IETE 47th Mid Term Symposium (MICTDI-2016) held at CSIO, CSIR, Chandigarh, on 9 April 2016. He has been awarded for his contributions in Quality and Reliability Assurance of Missile Systems. Prof. Kaptan Singh Solanki, Hon'ble Governor Haryana, Punjab and Administrator UT, Chandigarh, presented the award to Shri Rayudu.

Higher Qualification Achieved

Advanced Numerical Research & Analysis Group



Shri Chebolu NAB Sankar, Sc F, has been conferred PhD in Computer Science by the School of Computer and Information Sciences, University of Hyderabad, for the thesis entitled 'Compiler Optimizations: Parameter Tuning, Option Selection and Adoption Scheme.'

DRDO: Harnessing Science for Peace and Security

डीआरडीओ न्यूज़लैटर

The Beginnings — Defence Science

In continuation of series of articles based on the monograph, "Defence Research and Development Organisation: 1958-1982", by Shri RP Shenoy, former Director of Electronics Research and Development Establishment (LRDE), Bengaluru, published by Defence Scientific Information and Documentation Centre (DESIDOC), Delhi in 2006.

The colonial policy was enforced even more rigorously as far as defence planning for India was concerned. It was made an integral part of Britain's own policy and strategy for the defence of the British Empire and was formulated in UK. To prevent a possible repetition of the 1857 Sepov Mutiny, the British Government had made sure till World War I that the officers of the Indian Army were exclusively British. The Indian armed forces were predominantly the ground forces, namely the Army with the Royal Navy providing the backup on sea. As a sop to the increasing criticism by the nationalist elements, the British Government after the World War I created an Indian Navy and an Indian Air Force but these were only token forces. Even after political reforms were introduced in India in the form of legislative assemblies for the governance of the provinces with elected representatives, the subject of defence was kept out of the purview of Indian legislators.

The position just before the outbreak of the World War II was, that the responsibility for civil Government and defence of the country vested with the Governor-General, subject to direction and control by the British Cabinet in London through the Secretary of State for India. The Commander-in-Chief was appointed by the Royal Warrant. He was the Supreme Commander of the Defence Forces in India and was the administrative and executive head. He was directly responsible to the Crown for the structure and strength of the Armed Forces, the recruitment and training of military personnel, acquisition, usage and the maintenance of military hardware, war preparation, and the conduct of war. In the order of precedence, he was next to the Governor General. The Armed Forces in India were thus an extension of the British War Office. The Commander-in-Chief was assisted in his executive responsibilities by four Principal Staff officers, namely the Chief of General Staff, the Adjutant General, the Quarter Master General, and the Master General of Ordnance (MGO). Under the MGO, ordnance factories had been established in India for the manufacture of arms, ammunition and connected stores, clothing, harness and saddlery. These factories functioned as subsidiaries to the Royal ordnance factories in UK, as a result of which the production was limited to small arms and ammunition only. The first cell for inspection of the products of the Ammunition Factory at Khadkee was set up in 1869 and its scope was enhanced later to include modifications. It was also vested with the powers of the authority holding sealed particulars relating to production of the ammunition. With increase in activities, the cell became the Inspectorate of Armaments. For the purchase and development of general stores, the Inspectorate of Stores Services was formed and attached in 1929

to the Harness and Saddlery factory in Kanpur. A small cell was set up in Rawalpindi (now in Pakistan) in 1939 to include the inspection of telecommunication equipment and the scientific instruments for the army in India. It was called the Inspectorate of Scientific Stores.

Developments during World War II

With the outbreak of the World War II, large-scale recruitment campaign was launched to expand the strength the Indian Army. The size of the Indian Armed Forces expanded more than ten times and reached two million by 1943. Correspondingly, the ratio of the Indian officers rose from 10 per cent in 1938 to 35 per cent in 1944. The Defence Department of the Indian Government, which was a relatively small department before the war, had greatly expanded necessitating the formation of a War Department under the Commander-in-Chief for all important issues concerning the army and the war. A second department came into existence to look after relatively unimportant subjects such as military lands, printing, army list, prisoners of war, and so on. When war started, difficulties were experienced by the military in UK to sustain the increased equipment requirements of the eastern theatre of war. The Government of India was forced to put together facilities and resources for investigation and limited technical development of equipment for the armed forces. The existing inspectorates under the Directorate of Armaments were expanded and utilized for conducting limited experiments in munitions and small



arms so that reference to UK could be minimised. For clothing and general stores, the Controllerate-General of Inspection was established with the dual functions of inspection, and research and development. For vehicles, the Chief Inspectorate of Mechanization under the Director of Mechanization, carried out not only inspection but also technical trials. The small electronics cell was moved to Kolkata, where it became the main centre for supply of war stores for the fighting services.

The War Department was subsequently put under the South East Asia Command (SEAC) in 1943 and the Commander-in-Chief in India was entrusted with the tasks of taking effective steps to prepare India as the base of operations for SEAC and for training of the troops. In addition to the War Department, a new supply department was created and an Indian member of the Governor-General's Executive Council was made responsible for the mobilization of the country's production potential for the war. Correspondingly, the role of the inspectorate was expanded to take up activities of indigenising the production of accessories and attachments to the main equipment, and to a limited extent, the modification of some of the

equipment to stand the conditions of heat, humidity and dust.

As the war was drawing to a close, the Government in Britain turned its attention to the postwar planning and reconstruction of the home country, the dominions and the rest of its empire in the colonial framework. It was in this context that the British Government requested the Royal Society through a communication from the Secretary of State for India to depute Professor AV Hill, who held a research fellowship of the Royal Society, to "see as much as possible of India's scientific, technical and research work" and advise the Government on the organisation of scientific and industrial research as a part of the reconstruction plan for India in the postwar scenario and in coordination with similar activities in Britain. Professor Hill visited India between November 1943 and April 1944. and submitted his report entitled Scientific Research in India11. He identified a variety of problems research confronting scientific in India. Even though Indians had made notable contributions physics, mathematics, and in chemistry, he found that at the university level, areas such as geological sciences and biological sciences were weak in terms of

teaching and research, biophysics was practically unknown except at the Bose Institute in Calcutta (now Kolkata), and biochemistry though strong in some universities, was not associated with physiology and biology but with chemistry. He also observed that scientific research was being conducted under a variety of disparate institutions which had prevented a balanced approach and a common policy for research. In spite of the enormous amount of clinical material available, practically no research was being carried out in clinical sciences by medical colleges. He went on further to state that none of the colleges and the departments of engineering and technology could be counted as centres of excellence. Further, he remarked that industries dealing with scientific and surgical instruments had not been established in the country. He also noted the widespread lack of interest in research on the part of the industry in India except for a few benefactors, in particular the House of Tatas who had made substantial contributions to science, medicine, and technology and who had set up a major industrial laboratory in Jamshedpur for metallurgy.

To be continued...

Visitors to DRDO Labs/Estts

Centre for Artificial Intelligence & Robotics

✗ Lt Gen SPS Katewa, AVSM, Commandant ASC Centre, and team visited Centre for Artificial Intelligence and Robotics (CAIR), Bengaluru, on 11 March 2016. Shri Sanjay Burman, OS and Director, CAIR, briefed the visitors about the activities of the Centre. Robotics technologies developed by CAIR were demonstrated to Lt Gen Katewa.

✗ Dr AN Yellappa Reddy, IFS (Retd), former Conservator of Forest and Secretary, Department





of Ecology, Environment and Forest, Government of Karnataka visited CAIR on 16 March 2016. Dr Reddy discussed greening of the CAIR campus.

Defence Scientific Information & Documentation Centre

Dr S Christopher, Secretary, DD R&D and DG DRDO, inaugurated "Interactive Touch Screen Kiosk" facility for searching online library databases of Defence Science Library (DSL), Defence Scientific Information and Documentation Centre (DESIDOC), Delhi, on 7 April 2016. Dr CP Ramanarayanan, DS and DG (ACE) and CC R&D (HR), was also present on the occasion.

Shri Gopal Bhushan, Director, DESIDOC, welcomed Dr Christopher and Dr Ramanarayanan and gave presentation on DESIDOC services provided to DRDO community. He briefed about the new IT-based initiatives taken recently to augment the services 24x7 to the users.

In his interaction with DESIDOC family, Dr Christopher described DESIDOC as the front face of the organization. He appreciated the Centre for projecting first-hand account of DRDO's capabilities in the area of advanced defence technologies and providing services to scientific community.

Dr Christopher also inaugurated "Gyan Sanchar", the promotion and sales division of scientific publications being brought out by DESIDOC.



Recruitment & Assessment Centre

Dr S Christopher, Secretary, Department of Defence R&D and DG DRDO visited Recruitment and Assessment Centre (RAC), Delhi, on 3 April 2016 and inaugurated e-Assessment Board set up. E-Assessment board set up, an in-house development by RAC, comprises LAN based paperless selection board with display in front of each board member on separate console for Board Chairman. Board members can view brief biodata, detailed biodata and presentation of candidate under assessment on the display screen.

Dr Christopher interacted with RAC officials regarding current and forthcoming activities. He appreciated the efforts made by RAC in selection and assessment of scientists in DRDO and made many innovative suggestions to bring improvements and reforms in the system. He also watered a mango sapling planted by him in his last visit in RAC premises.



Research Centre Imarat

A joint Parliamentary Committee on Food Management visited Research Centre Imarat (RCI), Hyderabad on 22 April 2016. Shri AP Jithender Reddy was the Chairman of the Committee. The Committee, consisting of four MPs, studied the various facilities being provided in the canteen of RCI.

Dr G Satheesh Reddy, SA to RM and Director RCI briefed about new facilities being planned for augmentation of canteens.